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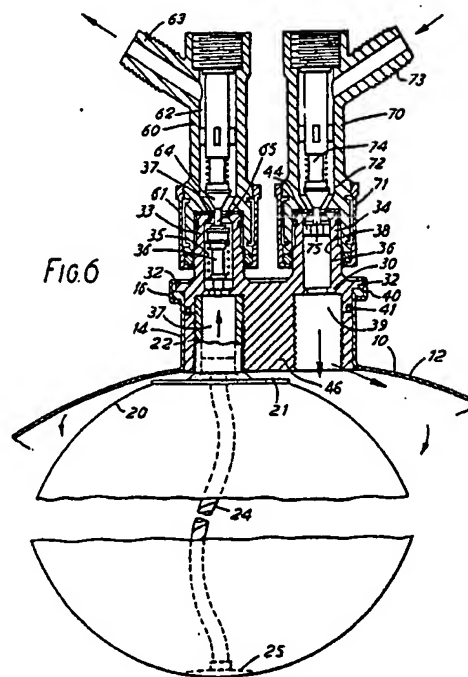
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54 Container for liquids.

57 A container for transport, storage and dispensing of beverages, such as beer, comprises an outer container (12) of plastics such as PET, and an inner bag (20) of flexible material, such as layered polyethylene. The inner bag (20) is connected to an outlet (33) which can receive a coupler (60) connecting the outlet to a dispensing tap (80), this connection being similar to a conventional quick-fit coupler. An inlet (34), which can receive a coupler (70), enables pressurised gas or air to be supplied to the space between the outer container (12) and inner bag (20) to apply pressure to the bag to expel beverage from the bag through the outlet (33). The bag (20) is filled with beverage through the outlet (33), which has a non-return valve (36, 37) to close the outlet, after filling, during transport of the container to the dispensing location. The inlet (34) provides a permanently open passage which, after the container has been emptied and the gas or air line disconnected, allows any remaining pressure to escape, or removing any danger which might arise with a pressurised container, particularly if the container is discarded. The container is relatively light-weight and inexpensive, and can be filled and used to dispense beverage without the beverage coming into contact with air or pressurising gas at any stage until it leaves the dispensing tap.



## CONTAINER FOR LIQUIDS

This invention relates to containers for liquids.

The invention relates in particular to containers for transport, storage and dispensing of beverages, particularly pressurised beverages such as beer, wine or soft drinks, which are to be dispensed under pressure from the container.

Beer and similar beverages are often supplied in metal kegs, from which the beer is dispensed by supplying carbon dioxide gas to the top of the keg. Kegs have the disadvantage that they are relatively heavy, entailing high transport costs, and are expensive, so that empty kegs must be retrieved from customers. These disadvantages are particularly acute when kegs are used for export of beer or the like.

In recent years, plastics containers have been developed for use with beverages such as beer or carbonated soft drinks. In particular containers made from PET (polyethyleneterephthalate) have been manufactured. However, such containers have the disadvantages that PET is not completely impervious to oxygen, so that beverages such as beer which deteriorate rapidly on exposure to oxygen, can only be stored for short periods, and that the method of filling such containers allows the beverage to come into contact with the air.

British patent 1 190 593 describes a container having a rigid outer shell and an inner flexible container, with a valved inlet through which pressurising gas or air can be supplied to the space between the inner container and the shell, thereby to expel fluent material from the inner container through a valved outlet connected to the inner container. The container has a relatively complex arrangement of inlet and outlet valves and pressure relief valves which would make the container expensive to manufacture.

It is an object of the invention to provide a container for liquids, particularly pressurised beverages, which is relatively light and inexpensive and which can be filled and used to dispense beverage without the beverage in the container coming into contact with the air at any stage until it is dispensed.

This invention consists in a container for transport, storage and dispensing of beverages, comprising an outer container, an inner bag of flexible air-tight or gas-tight material, an outlet connected to the bag, and an inlet connected to the outer container through which gas or air under pressure can be supplied to the space between the outer container and the bag thereby to apply pressure to the bag to expel liquid from the bag through the outlet, characterised in that the outlet includes a normally closed valve adapted to be opened auto-

matically by connection to the outlet of a coupler connected to a beverage dispensing line, and the inlet for gas or air comprises a permanently open passage.

Thus the outlet and the inlet may each be adapted to form one part of a coupling mechanism for connection of a beverage line or a gas or air line. For example, each could be formed as the male valve part of a conventional quick-fit coupler such as is used in systems for dispensing soft drinks.

Preferably, the outer container has a neck into which is fixed a closure member in which the inlet and outlet are mounted.

The outer container may be made from plastics such as PET. The inner bag may be made from any suitable material which is approved for use with beverages.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic cross-section through a container in accordance with the invention, showing the container connected to a dispensing tap and source of pressurised gas, and

Figure 2 is a cross-section, on a larger scale, through the neck of the container,

Figure 3 is a plan view of the neck of the container,

Figure 4 is a cross-section of line 4-4 of Figure 2,

Figure 5 is a cross-section on line 5-5 of Figure 2, and

Figure 6 is a view similar to Figure 2, but showing coupling members connected to the container.

Referring to the drawings, a container in accordance with the invention comprises an outer container 10, an inner bag 20 and a closure 30.

The outer container 10 is formed of PET and has a body 12, preferably having rounded contours to enable it to withstand internal pressure, and a neck 14 surrounding the opening in the container. The neck terminates in an outwardly extending rim 16. The container is mounted in outer casing 50 which serves to support the container and to protect it during transport and storage. The casing 50 can be of any suitable material, such as wood or cardboard.

The inner bag 20 is formed of a material which is impervious to air or carbon dioxide and which is suitable for contact with the beverage to be contained. A suitable material is a layered polyethylene material which is sold for food or beverage packaging. At the mouth of the bag 20 is a tube 22

having a flange 21 to which the bag is welded. The tube 22 enables the bag to be connected to the closure 30, as described below. A flexible member 24 is secured at one end to the tube 22 and at the other end to a plate 25 fixed to the bottom of the bag 20. The member 24 serves to maintain an open passage to the mouth of the bag and prevent the material of the upper part of the bag from collapsing over the mouth of the tube 22 under the applied gas pressure when the bag is partially emptied. The member 25 is in the form of a helically-wound strip of flexible plastics material of a kind approved for contact with beverages, though the strip could take other forms.

The closure 30 is a plastics moulding having a body 31 shaped to fit into the neck 14 of the outer container 10. An outwardly extending flange 32 on the body 31 fits against the rim 16 of the outer container 10. The closure 30 is fixed to the outer container 10 by means of a metal ring 40 crimped over the rim 16 and flange 32. The body 31 has two bosses 33 and 34, which in use receive respective couplers 60 and 70 (Figure 6). The bosses have bores 35 and 38, which communicate with respective counterbores 37 and 39 extending through the body 31 of the closure. The tube 22 at the mouth of the bag 20 is a push fit into the counterbore 37 in boss 33, and may be bonded to it using a suitable adhesive. An O-ring 41 is fitted between the closure 30 and the neck 14 of the outer container 10, to prevent leakage of the pressuring gas or air.

The bore 35 in the boss 33 contains a spring-loaded valve member 36 which is normally held against a valve seat 42, to close the valve, as shown in Figure 2, but is moved away from the valve seat when the coupler 60 is connected to the boss 33, as described below.

The bore 38 in the boss 34 is empty except for a member 44, which serves to open the valve in coupler 70 when it is connected to the boss 34, as described below. The member 44 is perforated, so that the bore 38 provides a permanently open passage through boss 34. The member 44 may, for example, be a spider, as shown in Figure 5, which is push-fitted into the bore 38.

The boss 33 and the coupler 60 may be similar to the male and female parts of a conventional quick-fit coupler, such as is used to connect a dispensing line to the outlet valve of a keg. Thus the coupler 60 includes a spring-loaded locking sleeve 61 by means of which it is releasably connected to the boss 33. The coupler 60 has a bore 62 which communicates with bore 35 in the boss 33 and with a nozzle 63. The nozzle 63 can be connected to an inlet line for filling the container and, subsequently, to an outlet line 66. The bore 62 contains a normally closed valve 64. The valve

has an actuating pin 65, which when the coupler 60 is connected to the boss 33, engages the valve member 36 to lift the valve members 36 and 64 from their seats.

The boss 34 is similarly shaped to receive the coupler 70, which is releasably held in position by a locking sleeve 71. The coupler 70 has a bore 72 communicating with the bore 38 and with a nozzle 73, which can be connected to a source of pressurising gas or air. The bore 72 contains a normally closed valve 74 having an actuating pin 75 which, when the coupler 70 is connected to the boss 34, engages the member 44 to lift the valve member 74 from its seat.

The body 31 of closure 30 has ribs 46 which extend downwards to the level of the lower end of neck 14 of the outer container 12. The ribs prevent the upper part of the flexible bag 20 from being forced upwards into the neck 14 when the bag is filled.

In use, to fill the container, depending on the filling pressure of the beverage, a gas or air line is first connected to the boss 34 to produce a counterpressure in the space between the bag 20 and the outer container 10. A beverage supply line is then connected to the boss 33. The gas or air counterpressure is adjusted so as to be slightly lower than the pressure of the beverage supply line, so that the beverage flows into the bag 20 at a controlled rate, thus reducing to a minimum the turbulence and foaming of the beverage as the container is filled. After filling, the beverage supply line and the gas or air line are disconnected, and the valve 36 automatically closes. The container is then ready for transport to the customer.

To dispense beverage from the container, a dispensing line 66 is connected to the boss 33 through a coupler 60, and a gas line 78 is connected to boss 34 through a coupler 70. The gas line 78 may be connected, as shown in Figure 7, to a source 82 of pressurised carbon dioxide, for example as used in conventional keg dispensing systems. The dispensing line 66 may be connected to a conventional dispensing tap 80. The gas entering the space between the outer container 10 and the bag 20 applies pressure to the bag as shown by the arrows in the drawings, and forces the contents of the bag to flow out through the dispensing line 66 when the dispensing tap 80 is open. The pressurised driving gas or air between the bag 20 and the outer container 12 will maintain the pressure on the bag, ensuring that at all stages of dispensing a pressure is maintained on the beverage itself, which is often necessary to preserve the character and flavour of the beverage.

It will be appreciated that, in filling the container the beverage does not come into contact with the air. In dispensing beverage from the con-

tainer, the beverage in the container does not come into contact with the pressurising gas or air, or with ambient air. The container is therefore suitable for beverages such as beer which deteriorate on contact with the air.

After the container has been emptied, the couplers 60 and 70 are disconnected, so that the container can be discarded, or returned to the beverage manufacturer for refilling. The open bore 38 in the boss 34 allows any pressure remaining in the gap between the outer container 12 and the inner bag 22 to escape, so removing any danger which might arise with a pressurised container, particularly if the container is discarded.

The container of this invention can be made relatively cheaply. The PET used for the outer container can be of relatively low quality, since it does not come into contact with the beverage, but is required only to withstand the pressure of the dispensing gas or air and to provide protection for the inner bag. The container could, for example, be made from recycled PET. The container is also relatively easy to assemble.

In assembling the container, the inner bag is bonded to the closure which is then inserted into the neck of the outer container, the bag being folded to fit easily through the neck. The closure is then fixed in position by crimping the metal ring in place.

Because of the relative cheapness of materials and manufacture of the container, it could be used as a non-return package, particularly in the export market. This, in conjunction with the light weight of the container, will reduce transport costs considerably.

The container could be provided in a range of sizes, for example from 1 gallon (4.55 litres) to 50 litres, to cater for sales for home use as well as to sales to public houses and bars.

It will be appreciated that modifications could be made in the described embodiment. For example, the container could be mounted in other positions, for example inverted, in which case the flexible member 24 in the bag 22 could be omitted. Other arrangements for coupling the beverage line and gas or air line to the container could be employed.

Various sources of pressurised gas or air could be used. For containers sold for home use, for example, an air compressor, or a hand-operated or foot-operated air pump could be used, connected by a flexible hose to the inlet of the container. A simple hand-held dispensing tap could be used, connected by a flexible line to the outlet of the container.

#### Claims

1. A container for transport, storage and dispensing of beverages, comprising an outer container, an inner bag of flexible air-tight or gas-tight material contained within the outer container, an outlet connected to the bag, an inlet connected to the outer container through which gas or air under pressure can be supplied to the space between the outer container and the bag thereby to apply pressure to the bag to expel liquid from the bag through the outlet, characterised in that the outlet includes a normally closed valve adapted to be opened automatically by connection to the outlet of a coupler connected to a beverage dispensing line, and the inlet for gas or air comprises a permanently open passage.

2. A container as claimed in Claim 1, in which the inlet is adapted to receive a coupler connected to a gas or air line, the coupler having a normally closed valve which is opened on connection of the coupler to the inlet by engagement with an operating member fixed in the inlet.

3. A container as claimed in any preceding claim, in which the outer container has a neck in which is fitted a closure member having two up-standing bosses forming the inlet and outlet respectively, each boss being adapted to receive a coupler connected to a beverage line or a gas or air line.

4. A container as claimed in Claim 3, in which the mouth of the inner bag comprises a collar which fits into a counterbore in the closure member communicating with a bore in the boss forming the outlet.

5. A container as claimed in any preceding claim, in which the outer container is mounted in an outer casing adapted to support the container in use and to protect it during transport and storage.

6. A container as claimed in any preceding claim, in which the outer container is of plastics, such as PET.

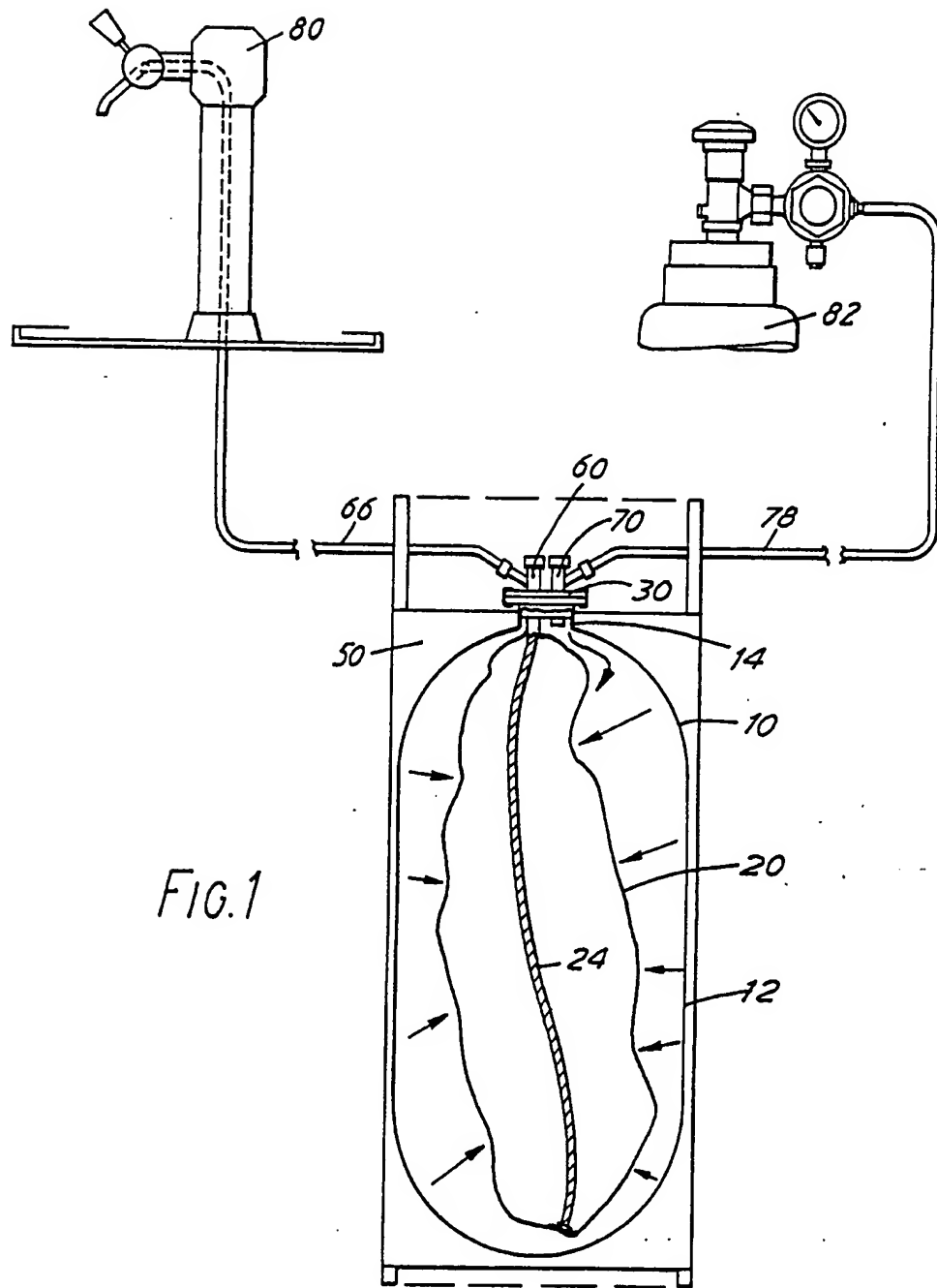
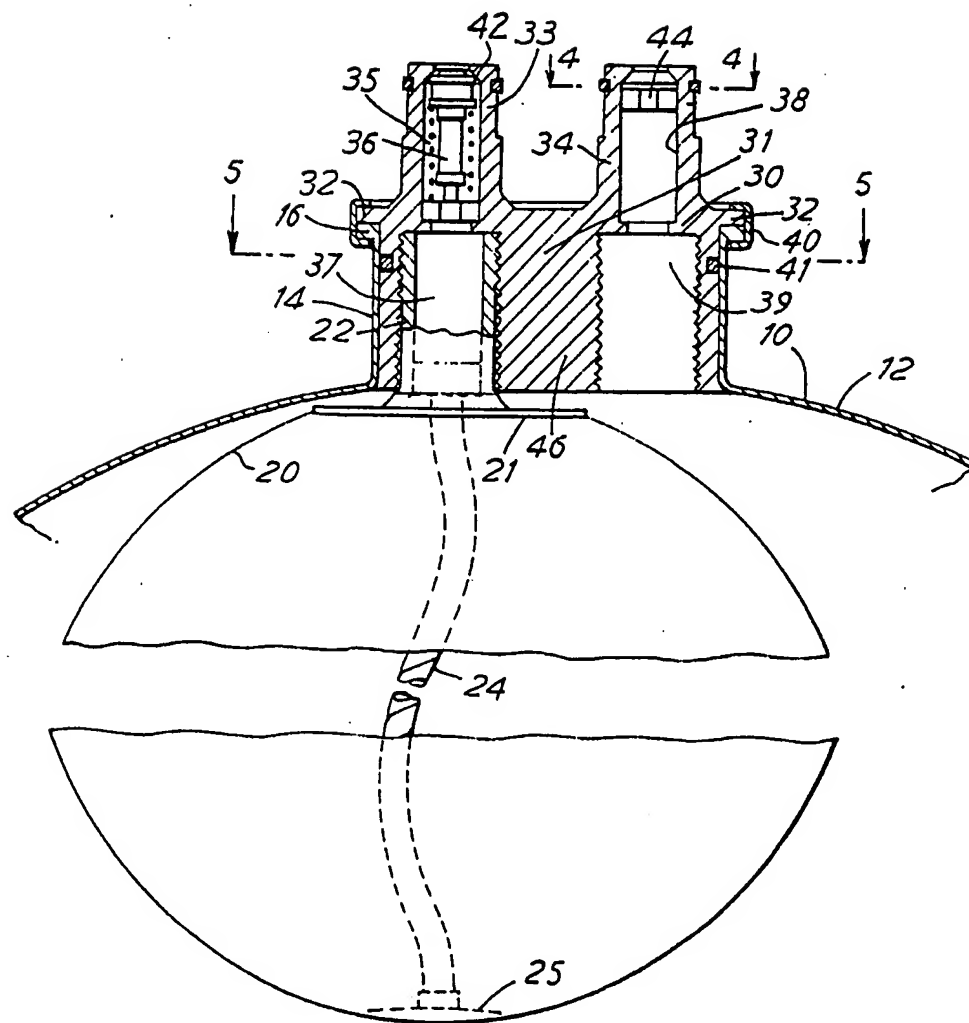


FIG. 2



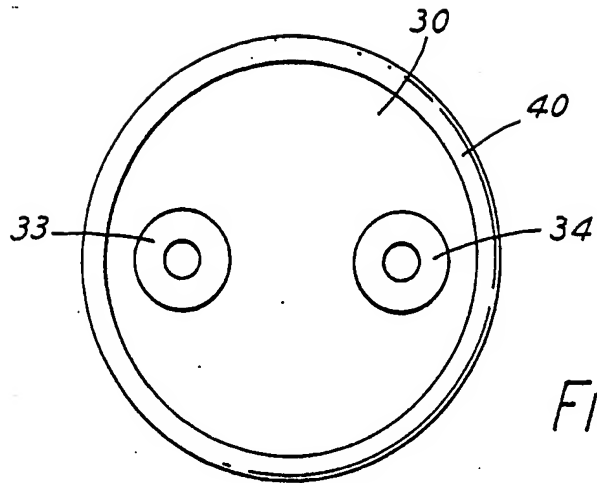


FIG. 3

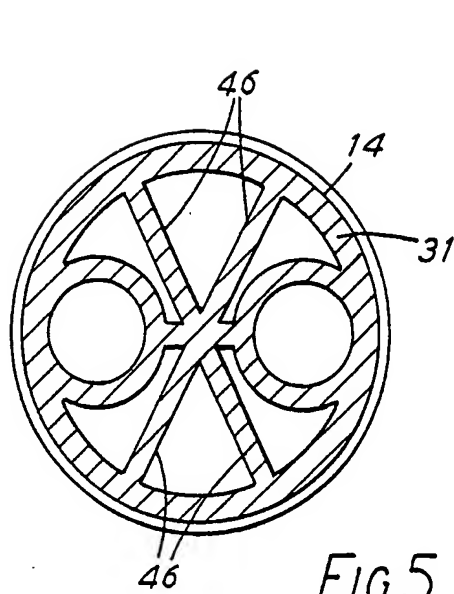


FIG. 5

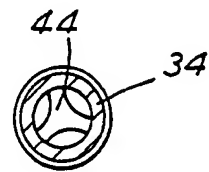
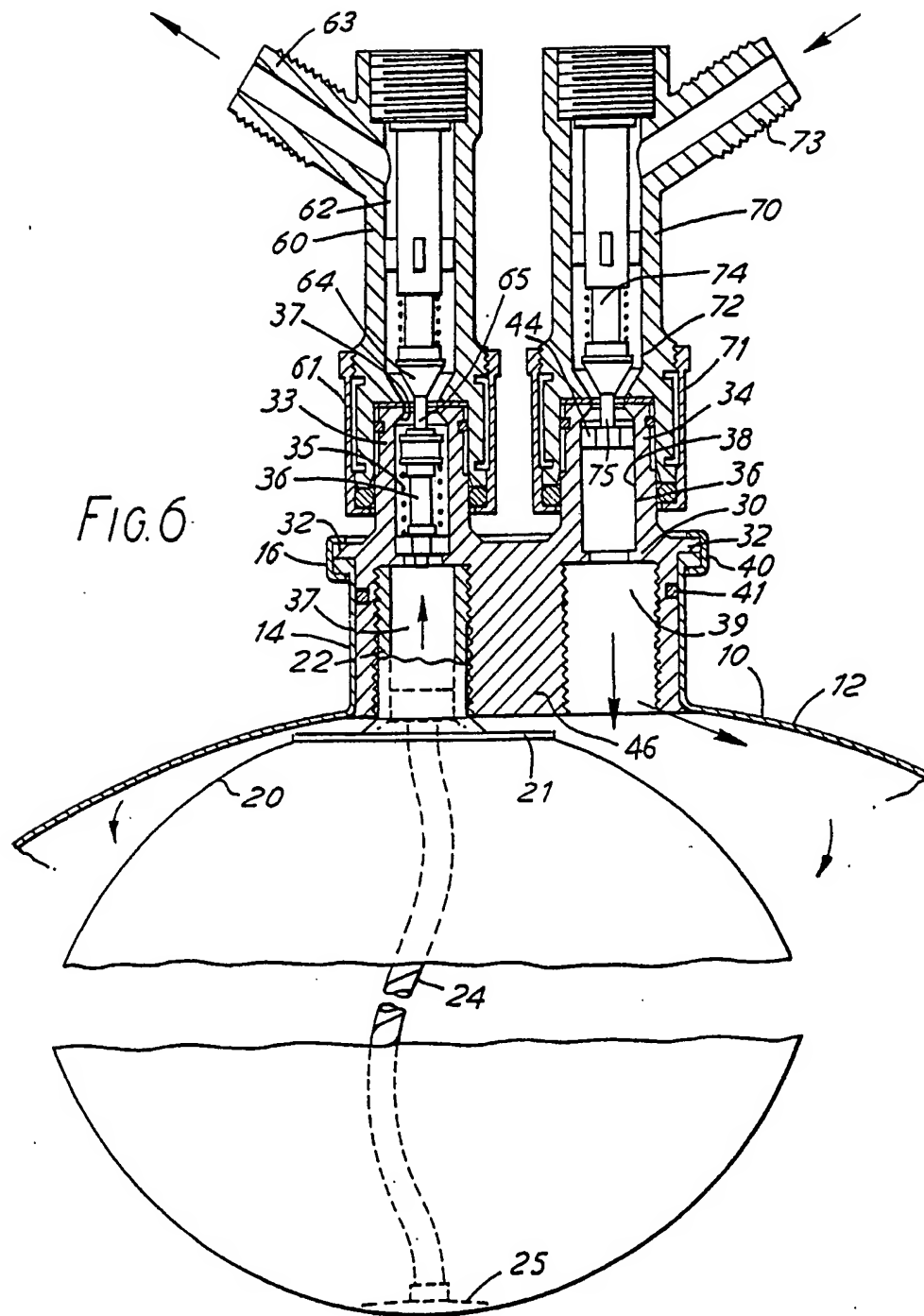


FIG. 4



RESERVE

## PATENT SPECIFICATION

1,032,825

DRAWINGS ATTACHED.

1,032,825



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Complete Specification Published: June 15, 1966.

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Index at Acceptance:—F1 R15A.

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## COMPLETE SPECIFICATION.

## Beverage Storage and Dispensing Apparatus.

## ERRATUM

SPECIFICATION NO. 1,032,825

AMENDMENT NO. 1

Page 1, Line 3 for "Scotland Brewers Ltd. read "Scottish Brewers Ltd."

THE PATENT OFFICE  
22nd July 1966

D 73764/18

quantity of beverage from a volume of beverage being stored within said keg, cask or container.

According to one feature of the invention, beverage storage apparatus comprises a gas-tight container having a liquid-tight collapsible bag disposed therein, an outlet in the container, a quantity of beverage within the bag, an extractor tube extending into said bag from or through said outlet and provided with an opening within the bag, a sufficient quantity of gas stored under supra-atmospheric pressure in the volume defined between the container and the bag to expel substantially the entire liquid content of the bag through said extractor tube, and closure means temporarily preventing expulsion of beverage from the container. Preferably the opening in the extractor tube is formed by the open end of the tube. Where, as is usually the case, it is desirable to ensure that the entire contents of the bag will be expelled from the container, the opening in the extractor tube should be arranged in a part of the bag to which, in the normal operating position for the container, beverage within the bag would drain. Thus for example, where the container is designed to

uroi or the rate of expulsion preferably being through a flow-rate regulator associated with said dispense valve. Conveniently the gas is compressed air.

Preferably, after filling the bag with beverage, a sufficient charge of compressed air is forced into the volume between the container and the bag, of such pressure that the entire contents of the bag may be expelled without recharging the container with compressed air. Suitably, the apparatus incorporates a constant flow-rate valve so that, while the pressure of the gas exceeds a determined value, the maximum flow-rate of beverage through the outlet will be substantially independent of the actual gas pressure within the container.

Two particular embodiments of apparatus in accordance with the invention designed for the storage of beer, will now be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is a partially sectioned side elevation of a first embodiment of apparatus, and

Figure 2 is a partially sectioned side elevation of a second embodiment of apparatus.

[Pr ]